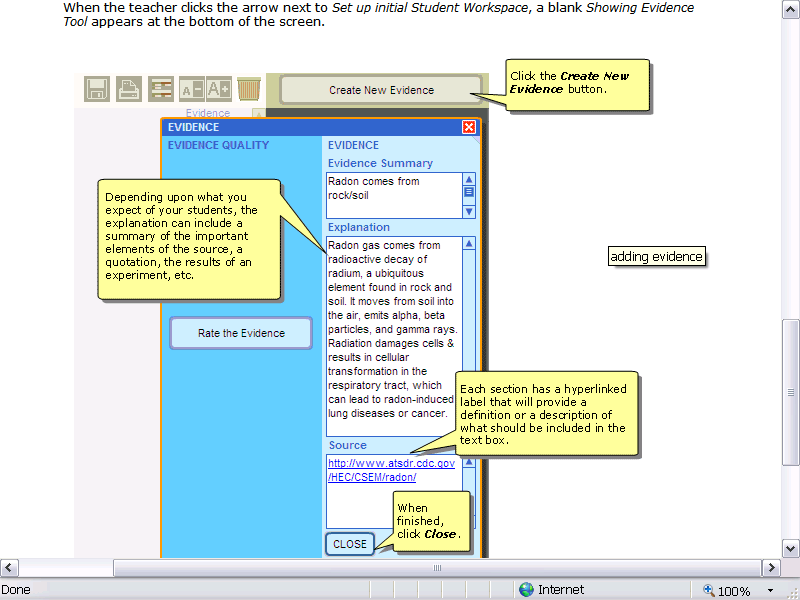
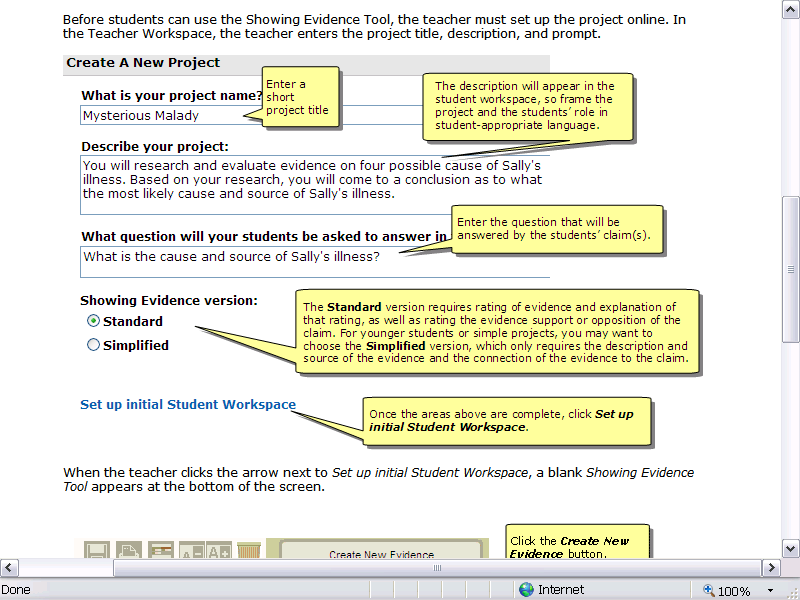
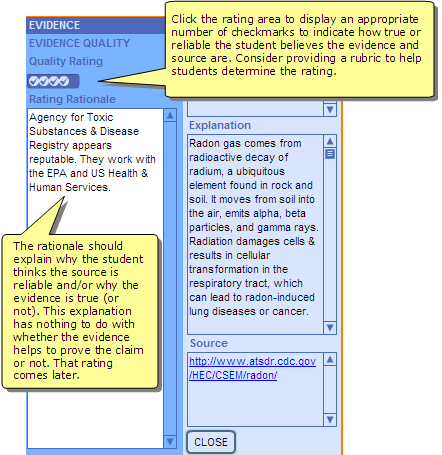
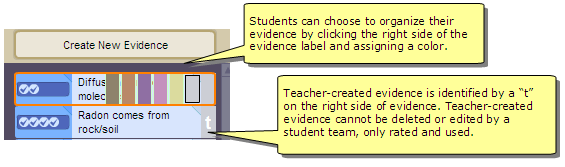
**The Showing Evidence Tool**

The Showing Evidence Tool helps students learn how to construct well-reasoned arguments and prove their case with credible evidence. The tool provides a visual framework to make claims, identify evidence, evaluate the quality of that evidence, explain how the evidence supports or weakens claims, and reach conclusions based on the evidence. This thinking tool supports activities where students debate differences, make and defend decisions, and analyze conflicting information.

The teacher can choose to pre-populate the case workspace with claims or evidence, or leave it blank.  The teacher decides to add evidence to help demonstrate how to describe and rate evidence. With the Showing Evidence case set up as desired, the teacher scrolls to the bottom of the screen, and clicks the **Submit** button.   


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Creating, Clarifying, and Rating Evidence  
The teacher provides students with a list of starting resources—Web sites, magazine articles, and books. Students begin gathering evidence to answer the question, “What is the cause and source of Sally's illness?” In this use of the tool, the teacher asks the students to collect evidence before creating a claim. In other projects, students can start their use of the tool by creating a claim and then finding evidence to see if it is true.  
  
The teacher demonstrates how to use the tool with evidence that has been pre-populated into the case. He double-clicks the item in the evidence bin and discusses the quality of evidence, reliability of the source, and the types of acceptable evidence. He then clicks the ***Rate the Evidence*** button and discusses the purpose of the rating and the rating rationale.  
  
Together, he and his students create a rubric to help them evaluate the quality of the evidence. They decide on their own rating system:

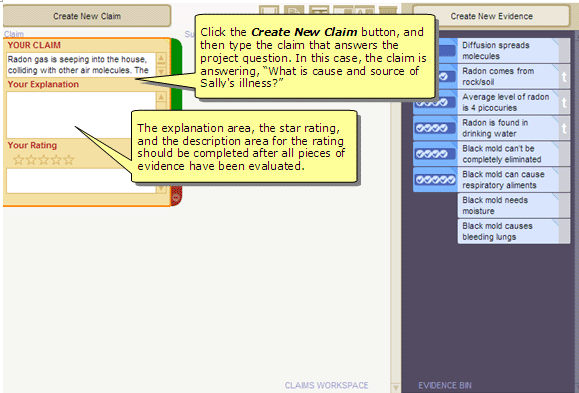
* One check: The evidence is just someone’s opinion without any basis to back it up.
* Three checks: The source of the evidence appears to be credible and trustworthy, but there is no way to check.
* Five checks: The evidence is verifiable and the source is very reliable.

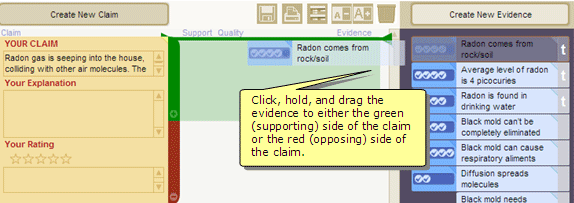
  
  
The teacher then demonstrates how to create a new piece of evidence while the students provide suggestions for what to enter into the fields. The teacher shows that the evidence can be color-coded, if desired, to indicate some organizational meaning. He asks how they might choose to use the colors. One student says he would color all the evidence relating to a particular gas the same. Another student says that she would color by the type of evidence—  one color for evidence relating to medical conditions and another for gas laws. The teacher tells them they can use the color-coding feature to choose whatever meaning is helpful to them.  
  
  
Students then work in their teams to gather, discuss, create, and rate their evidence. The animated discussions let the teacher know that students are engaging in a productive exchange of ideas. He listens in as one team debates whether a source can be trusted. The students trade job assignments halfway through—one works in the tool workspace while the other looks for more evidence.

Creating One or More Claims  
As soon as students have gathered enough evidence, the teacher shows them how to create a claim. A claim could be created by the teams themselves without a teacher’s direct instruction. Because this is the first experience for the class with the Showing Evidence Tool, the teacher decides he wants all students to investigate one claim before proposing one of their own:

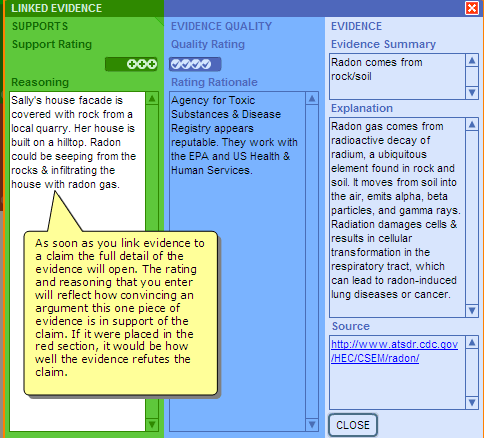
* Radon gas is seeping into the house, colliding with other air molecules. The family is getting cancer from breathing in the radon.

Students can then suggest a different claim, and can present their ideas to the teacher.     
  
The teacher demonstrates how to create a claim and explains the type of information that goes in each field.



Does the Evidence Support a Claim?  
After demonstrating how to create a claim, the teacher shows the students how to link a piece of evidence to the claim. He explains that when the evidence is sitting in the ***Evidence Bin***, it is neither positive nor negative; it doesn’t support or go against the claim. It’s neutral. But when they bring the evidence over into the ***Claims Workspace***, then they need to make a judgment call. Now they are evaluating the evidence to see if it helps or hurts their claim. Sometimes a piece of evidence could even be used to support or oppose the same claim! It depends on how they interpret and discuss the evidence.  
  
He demonstrates how to move the first piece of evidence to the claim and asks where it should go. Does this evidence support or weaken the claim? Most students say it helps the claim; a few say it hurts the claim. The teacher asks to hear their reasoning. One girl explains that you don’t know how much radon is in the air. Another student says that Sally’s house is covered in rock and that radon can be seeping into the house from the rock adding to the fact that this evidence supports the claim.   
  
  
  
The teacher tells them that they are both right. Their arguments will depend on how they interpret the evidence and explain their claims. At this point, he shows them how the evidence opens up a third pane when it is attached to either the supporting (green) side of the claim or the opposing (red) side of the claim.  
  
Just as they discussed how to rate the evidence quality, they again decide how to determine the rating for the support or opposition of the claim. The teacher explains that they’re only evaluating how this one piece of evidence supports or opposes the claim. When making this rating, they are not to consider how reliable the source is or whether they think the evidence is true—that assessment was done in the earlier rating (***Rate the Evidence***). So assuming for the moment that the evidence is true, how well does it support or oppose the claim? The students agree on the following elements of the rubric:

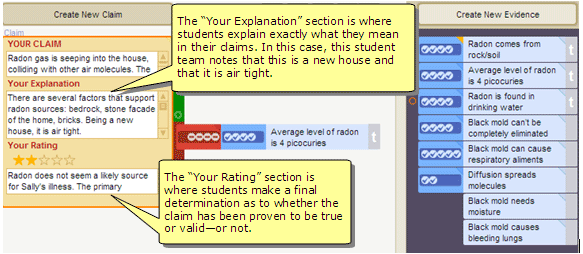
* One plus sign or minus sign: The evidence doesn’t do much to strengthen or weaken the claim. The claim would be almost the same without it.
* Three plus signs or minus signs: It does help to build the case (or build a case against it), but it’s not a really important piece of evidence.
* Five plus signs or minus signs: The evidence makes a very strong case for the claim (or case against the claim).

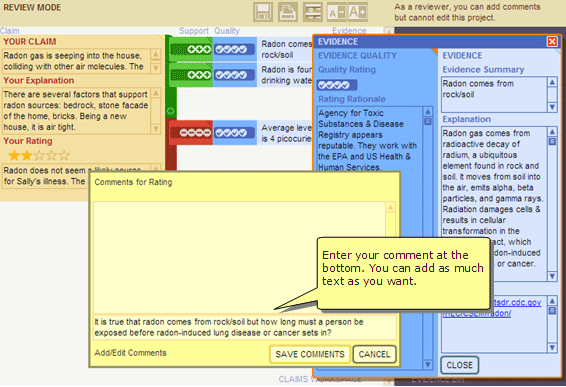
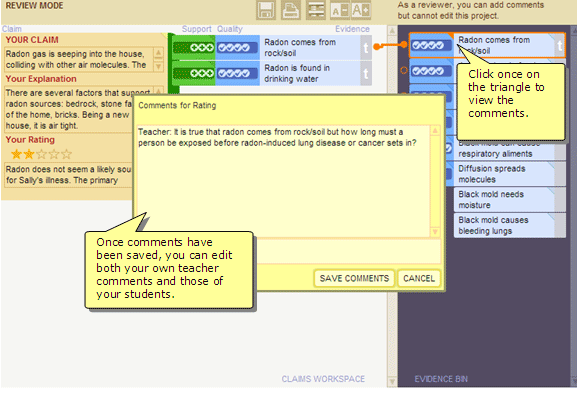
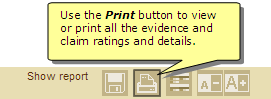


Rating the Claim

The students are near the end of their evidence gathering and evaluating, and they are attaching the pieces of evidence to the claim. Visually, they are beginning to see the pro and con evidence stacking up to help them make a decision as to whether the claim can be supported. The teacher discusses the ***Support*** versus ***Quality*** ratings that line up next to the claim. Both must be taken into consideration when weighing the evidence. If a really poor-quality piece of evidence strongly supports a claim, should the evidence be disregarded? What about a lot of so-so support? How do we weigh quantity over quality? What happens when a jury has to make a decision about whether someone is guilty or innocent? What are some of the things they consider? The teacher and students discuss these kinds of questions before they create a rubric for rating the claim. The students come up with the following rating system:

* **One star**: Considering all of the evidence and the quality of that evidence, this claim has been proven beyond a shadow of a doubt to be untrue.
* **Two stars**: Circumstantial or minor evidence does seem to support this claim, but not enough to make a decision. “Reasonable doubt” exists.
* **Three stars**: The evidence provided does support the claim, but there are still uncertainties as to whether that support really proves the claim is true. This rating is the result of a “hung jury.”
* **Four stars**: There is room for interpretation or other possibility, but considering all of the evidence and the quality of that evidence, the claim is strongly supported and is most likely true and/or valid.
* **Five stars**: Considering all the evidence and the quality of that evidence, it is quite obvious that this claim is true and valid.



Reviewing and Assessing Work  
At various points throughout the project, the teacher logs in to the Teacher Workspace where he can review and comment on any team’s work. Anywhere a small triangle appears in the corner of an evidence description, quality rating, support rating, or claim, a comment can be made by the teacher, team member, or a reviewing team.   
  
  
  
To view a comment, look for a bright triangle that indicates that a comment has been created. Click once on the triangle to open the comment.  
  
  
Near the end of the second to last work period, the teacher explains that peer-review teams have been set up. Each team will review another team’s evidence and explanations. He directs them to use the rubrics and discussions they’ve had to help provide good feedback to the other team. Peer-review teams are expected to make a minimum of three comments. He writes on the board the kind of comments that are expected and gets additional ideas from the students. He makes it clear that student teams should not make comments about whether they think the outcome is wrong or right, but instead base their comments on the quality of the argumentation.  
  
Another comment feature is located at the bottom of the screen. This feature supports open-ended communication between the teacher and students in the team for comments on the project as a whole. The comment box at the bottom of the screen can only be seen by the student team who has created the case and the teacher. This box is provided for more general comments and concerns that the teacher wants to share with the team, the team members want to share with each other when not working together, or comments back from the students to the teacher.  
  
  
Students use the comments made by their reviewing team and teacher to look at the evidence, claim, and overall project in a fresh light. They make any necessary edits and then write a conclusion with their recommendation to the EPA as to the most-likely cause and source of the sickness. Students print their case to review for their presentation to the grand jury.   
  
  
  
After the claims have been presented to the grand jury, the class votes on the cause of the illness. They discuss whether their claim and outcome of the trial were similar to that of the actual results of the case and how this relates to the question - How do we decide which scientific claims to believe?